NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FISH STREAM IMPROVEMENT (feet) Code 395

DEFINITION

Improve physical, chemical, and biological conditions of a stream system.

PURPOSES

To improve or restore aquatic ecosystem functions and values within a stream corridor. This practice may be applied to support one or both of the following purposes:

- To increase survival and/or production of desired fish species.
- To increase diversity and/or abundance of fish in the stream ecosystem.

CONDITIONS WHERE PRACTICE APPLIES

In streams and their floodplains where habitat deficiencies limit survival, growth, reproduction, and/or diversity of aquatic species in relation to the potential of the stream type. Practices should be applied within the context of overall watershed conditions and with clear objectives for instream improvement goals.

CRITERIA

General Criteria

- Planned fish stream improvements will be based on a stream assessment which identifies habitat limitations.
- Consult the Natural Resources Conservation
- The emphasis in fish stream improvement will be the establishment of a functioning stream channel, consistent with the geomorphical setting, which can:

  1. Access its floodplain,

  2. Carry its sediment (sediment delivered is balanced by sediment removed),

  3. Store water in stable banks and a healthy riparian zone.

- The stream improvement practices will then be designed using typical parameters from the same stream type. This will generally involve restoration of:

  1. A relatively low width-to-depth ratio;

  2. Appropriate riffle-pool periodicity,

  3. Bank stability;

  4. Stream length gradient relationships in a meandering stream consistent with local conditions and the geomorphological stream type.

For example, productive trout streams are usually characterized by stable, well vegetated undercut banks; channels which are relatively deep in relation to their width; pools (or riffles) spaced about 5-7 channel widths apart; and channels which are not aggrading or down cutting. Consult with the NRCS State Biologist for exceptions.

- All required local, state, and federal permits will be obtained by the landowner prior to installation of any stream improvement measures.

- Restoration of in-stream habitat should only occur after identified problems within the watershed, such as, point and non-point source pollution, land management, and other limiting factors have been addressed. Any stream habitat improvement project should be the end result of an interdiciplinary process which has determined the need for the project in a watershed context.

- Rock weirs, check dams etc. if appropriate for the stream type, will not reduce channel capacity to the extent that bank erosion and lateral migration of stream flows are induced.

- There are several options which can be used singly or in combination to improve stream habitat including:

    1. Stabilizing banks and improving instream cover.

    2. Improving water quality.

    3. Improving spawning and fish egg incubation conditions.

    4. Eliminating fish migration barriers.

Criteria for Stabilizing Banks and Improving Instream Cover

The most effective way to improve in-stream cover is to maintain or establish healthy riparian vegetation along the streambanks.

A well vegetated, relatively narrow, deep, meandering channel provides abundant cover in the form of overhanging banks, vegetation, and deep pools.

Stream improvements will be ineffective if the surrounding resource use contributes to the destruction of the stream fisheries habitat. Total watershed

- Utilize fencing and prescribed grazing to prevent bank deterioration, protect vegetation, and to provide off stream watering facilities as appropriate. Refer to NRCS Standards; Prescribed Grazing (528), Fencing (382), Use Exclusion (472), and Trough and Tank (614). In most instances, total exclusion of livestock is the best alternative.

- Maintain or establish a buffer of woody or herbaceous vegetation at least 33 feet wide between adjacent cropland and the edge of the streambank. Refer to NRCS Standards; Grass Filter Strip (393), and Forest Riparian Buffer (391) for recommended widths.

- Where possible, place planned fish habitat structures in areas subject to bank erosion. Where the primary purpose is to control streambank erosion to protect adjacent loss of land or damage to utilities, roads, buildings etc, refer to NRCS Standard, Streambank and Shoreline Protection (580).

2. Brush Control:

- Any planned mechanical and/or chemical brush control shall be done in accordance with NRCS Standard, Brush Management (314), and Pest Management (595).

  NOTE: Exercise extreme caution when applying chemicals adjacent to streams. All recommendations and application must be in strict adherence to, and consistent with registered use, label directions, and precautions.

- Grazing systems can benefit riparian zones. This technique requires very careful management to assure the site is not over grazed. Do not recommend this technique unless assured that the land user fully understands the grazing system, and is capable of managing the system.

3. Instream Devices:

- Structural instream improvement measures applied will be compatible with the geomorphological stream type. All structural measures applied will be analyzed for stability for the bankfull and 25-year flow events.

- All instream devices will be installed according to a design approved by the NRCS State Biologist and the MDNR Area Fisheries Manager.

- Instream devices will be protected from erosion by using loose rock riprap and/or shaping and seeding the bank.

Refer to NRCS Standards: Streambank and Shoreline Protection (580) and Critical Area Planting (342).

Criteria for Improving Water Quality.

- Improve or maintain vegetative cover throughout the local watershed to reduce sediment inputs to the stream and help maintain season long flows.

- Manage for well developed riparian vegetation to shade and cool the stream; to prevent bank erosion; to maintain narrower deeper channels; to filter pollutants from adjoining land uses; and to reduce frequency and severity of ice jam flooding.

- Protect streambanks and adjacent wetlands from excessive streambank trampling by livestock.

Criteria for Improving Spawning and Incubation Areas for Trout.

- All practices that reduce streambank and upland erosion to the stream as off site sources of sediment, will improve spawning habitat by maintaining clean gravels in riffles.

- Riffles and gravel spawning beds may be established in appropriate situations. Consult with the NRCS State Biologist and MDNR Area Fisheries Manager for sources of information.

- Spawning gravel size and configuration will be

Criteria for Eliminating Fish Migration Barriers.

- Proper culvert design and installation will allow for fish passage. Consult with the NRCS State Biologist and MDNR Area Fisheries Manager for design criteria and/or sources of local assistance.

- Diversion dams and other artificial barriers may require a fish ladder or similar structure. Consult with the NRCS State Biologist and MDNR Area Fisheries Manager for design criteria and/or sources of local assistance.

- Removal of woody vegetation and debris from the stream should only be done after careful consideration of the potential adverse consequences to stream dynamics and fisheries habitat. Most log jams are passable by fish and are desirable fish habitat.

CONSIDERATIONS

- Stream habitat improvement will serve to improve aquatic habitats and subsequently benefit plant and animal species of concern dependent on this environment. There may short term negative impacts when in-stream construction activities occur (eg. sedimentation causing turbidity and siltation).

  Therefore, timing of project activity is extremely important to reduce negative short term negative impacts.

- Grazing will be managed in the improved area to prevent excessive bank trampling, forage utilization and nutrient input.

- All material excavated or removed during construction will be placed so it cannot erode or float back into the stream unless it is properly stabilized and compatible with this standard.

- Careful consideration will be given to endangered or threatened species and non-target fish and wildlife species during the planning process.

improving conditions for a diverse and healthy aquatic ecosystem.

Plans and specifications for establishment and maintenance of this practice shall be prepared for each site based on principals contained in the USDA-NRCS National Planning Procedures Handbook (NPPH).

Plans and specifications shall be recorded using approved applications of FOCS, specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documents.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of this practice, its intended life, and the criteria for its design. The plan shall provide for periodic inspection and prompt repair, should the application of practices cause streambank or streambed instability. All instream structural measures shall be evaluated on an annual basis.

REFERENCES

3. The Guidelines for Management of Trout Streams in Wisconsin, 1967. Technical Bulletin #39.

4. Stream Habitat Improvement Handbook, 1992. US Forest Service. Technical Publication R8-TP16.

5. Hunt, R.L., 1993. Trout Stream Therapy. The University of Wisconsin Press. pp 74.

6. In: J.G. Miller, J.A. Arway, and R.F. Carline (Editors), 5th Trout Stream Habitat Improvement Workshop, Lock Haven University, Lock Haven, PA. Penn. Fish Comm. Publics, Hamsburg, PA. pp. 163-179.

7. Newbury, F.W. and Gaboury, N.N., 1983.Stream Analysis and Fish Habitat Design - A Field Manual. Newbury Hydraulics Ltd.Gibsons, British Columbia, Canada. 262 pp.